U.S. Department of Education - EDCAPS
G5-Technical Review Form (New)

Status: Submitted
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Technical Review Coversheet

Applicant: Old Dominion University Research Foundation (U411C190032)
Reader #1: **********

		Points Possible	Points Scored
Questions			
Selection Criteria			
Significance			
1. Significance		25	25
Quality of Project Design			
1. Project Design		35	35
Adequacy of Resources/Quality of Management Plan			
1. Resources/Management Plan		20	20
	Sub Total	80	80
Priority Questions			
Competitive Preference Priority			
Competitive Preference Priority			
1. Absolute Priority 3		5	5
	Sub Total	5	5
	Total	85	85

Technical Review Form

Panel #11 - EIR Early Phase Tier 1 - 11: 84.411C

Reader #1: **********

Applicant: Old Dominion University Research Foundation (U411C190032)

Questions

Selection Criteria - Significance

1. **The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:**

   (1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

   (2) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

Strengths:

The ARCS project was designed to improve elementary students' contact with computer science concepts and to provide STEM resources to students who may not be exposed to such content otherwise (p. e27). Teachers will demonstrate their understanding of how to incorporate instructional strategies through a process where their computer science strategies are aligned with their demonstration of mastery in this subject (p. e27). The project will extend the present strategy of teacher support of student competency in CS. The applicant identifies three broad educational problems to consider regarding issues to be addressed (e23): (1) a shortage of elementary educators equipped to integrate CS/CT; (2) the need for students who are prepared for a workforce requiring STEM & CS knowledge & skills; and (3) educational innovations in rural communities. By engaging the community through these three areas, there is a comprehensive approach to developing community learning that can lead to success in school and employment in the future.
By addressing the educational issues of improvement in underserved communities, the applicant addressed the criteria effectively. The applicant presents a project that combines culturally responsive pedagogies with an integrated approach to teaching CS. within existing subject areas does have the potential to increase understanding of how elementary teachers develop the capacity to implement instructional change (e26).
The applicant described a blended professional model that will be implemented to improve student knowledge and teacher competency. This is a feasible model considering the teachers will be engaged in professional learning along with the students' conceptual learning. Prior research has focused on secondary schools and the ARCS project will contribute to ways that existing knowledge can be shared and redesigned for elementary schools (p. e31).

Weaknesses:

N/A

Reader's Score: **25**

Selection Criteria - Quality of Project Design

1. **The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:**

   (1) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

(2) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

(3) The adequacy of procedures for ensuring feedback and continuous improvement in the operation of the proposed project.

Strengths:

The applicant provided goals to be achieved by appropriate objectives, and outcomes that have specific measurement activities (p. e 32-34). The applicant presents an effective outline of the goals, which are complete with appropriate objectives and outcomes, such as: (1) the development of an integrated CS curriculum for K-2; this concept is clear and will be measured continuously throughout the years of grant funding by the schools districts' performance monitoring activities; (2) the achievement of high-fidelity implementation which, through professional development, provides activities and instruction that will improve student outcomes and teacher content knowledge; and (3) building the capacity of project leadership through training and focused professional development to replicate and sustain the project. (e29-30). Comprehensive goals provide project participants a clear "roadmap" to follow and are important, especially during the early stages of project implementation. The outcomes would be measured by teachers' receipt of micro credentials and collection of lesson planning materials (p. e33).
The applicant provided a comprehensive logic model (Appendix G, p, e91) to demonstrate the conceptual framework of the proposed project (p. e36), the underlying belief being that all students and teachers have access to innovative computer science instruction. The impacts of the conceptual framework have measurability as well.
External evaluators will be utilized to gather survey information from participants for the entirety of the project implementation. Impact studies and a formal formative evaluation would be conducted and the results of the continuous review would note strengths and weaknesses within the program (p.e38).

Weaknesses:

N/A

Reader's Score: 35

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. **The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:**

   (1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

   (2) The qualifications, including relevant training and experience, of key project personnel.

   (3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

Strengths:

The applicant provided Appendix I (p. e96-97), complete with project milestones, timelines and responsibilities. Project tasks from years 1-5 are noted and collaboration among stakeholders is led by the listed responsible persons (p. e38). The project has leadership from professionals at ODU, UVA, and the Virginia Dept. of Ed. and ARCS will be directed by a comprehensive management plan. The applicant appropriately addresses the criteria through the description of the key personnel's substantial training and experience in grant management, STEM, Computer Science and professional development. These characteristics suggest the applicant organization has the capacity to execute the project effectively.

(e39). The applicant provided the resumes/biographical sketches of key members of the leadership team in the form of biographical sketches (p. e51-58).
The applicant described the commitment of in kind funds from project partners over the 5 year term of the project as an example of support for the project after grant funding ends (p. e 40). The demonstration of a methodology to secure support for the project is addressed through Code VA, which will provide no-cost PD to teachers across the state in order to strengthen the project and act as a commitment to work with project stakeholders after project funding ends.

Weaknesses:

N/A

Reader's Score: 20

Priority Questions

Competitive Preference Priority - Competitive Preference Priority

1. **Within Absolute Priority 3, we give competitive preference to applications that address the following priority:**

   Projects designed to improve student achievement or other educational outcomes in computer science (as defined in the notice). These projects must address the following priority area:

   Expanding access to and participation in rigorous computer science (as defined in the notice) coursework for traditionally underrepresented students such as racial or ethnic minorities, women, students in communities served by rural local educational agencies (as defined in the notice), children or students with disabilities (as defined in the notice), or low-income individuals (as defined under section 312(g) of the Higher Education Act of 1965, as amended).

   Note: Projects addressing this priority must be administered in a manner consistent with nondiscrimination requirements contained in the U.S. Constitution and Federal civil rights laws.

Strengths:

The applicant presented the project as one which will expand contact with STEM coursework and computer science curricula for rural, ethnic minority, and disadvantaged students (p. e23). By addressing the project goals, especially those with the task of increasing student readiness for STEM activities with CS coursework among high needs students, the applicant provided an adequate addressing of the priority area (p. e20). The applicant provided the example of working with project stakeholders and school district personnel in providing a clear plan to expand access to and participation in computer science education for the schools in this community (p. e30).

Weaknesses:

N/A

Reader's Score: 5

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Technical Review Coversheet

Applicant: Old Dominion University Research Foundation (U411C190032)
Reader #2: **********

		Points Possible	Points Scored
Questions			
Selection Criteria			
Significance			
1. Significance		25	25
Quality of Project Design			
1. Project Design		35	35
Adequacy of Resources/Quality of Management Plan			
1. Resources/Management Plan		20	20
	Sub Total	80	80
Priority Questions			
Competitive Preference Priority			
Competitive Preference Priority			
1. Absolute Priority 3		5	5
	Sub Total	5	5
	Total	85	85

Technical Review Form

Panel #11 - EIR Early Phase Tier 1 - 11: 84.411C

Reader #2: **********

Applicant: Old Dominion University Research Foundation (U411C190032)

Questions

Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

Strengths:

1.The applicant (ARCS) has appropriately addressed a dissemination process to illustrate how their project will increase knowledge or understand educational problems, issues or effective strategies. For example, teachers will: gain experiences from content knowledge through participation, integrate instructional approaches; have school year support and facilitate their own learning as they work individually and collaboratively. The applicant proposes to visit 5 regional meetings held at one of the partner schools to disseminate the project findings among the community (CS education field). If reasonable dissemination strategies are detailed, they could be useful to replicate in other settings such as, communities, districts, and states, teach valuable lessons, and could spread news about the project after the evaluation and during implementation, as well as increase knowledge or understanding of educational problems, issues, or effective strategies.

e91, e69, e31

2.The applicant has shown the effectiveness of their proposed program; interventions that will address the problem; and demonstrated how their proposed project (based on best available evidence) could build on previous existing strategies designed to appeal to diverse learners in rural settings and students from underrepresented minority groups who may lack interest in STEM and computer science. For example, the ARCS proposes to utilize the (ARCS Blended Learning Model) to modify, transfer, and/or redesign strategies for elementary students; expand access and participation in computer science coursework for high needs students; and equip K-5 teachers with content and pedagogical knowledge, and self-efficacy. To enhance their program, the applicant proposes to provide summer PD institutes, web-assisted PD (Professional Development); an external evaluation; and address the shortage of qualified STEM educators. Documented interventions, strategies, activities, and resources could ensure the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.
e41, e23

Weaknesses:

1.None Noted

2.None Noted

Reader's Score: 25

Selection Criteria - Quality of Project Design

1. **The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:**

   (1) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

   (2) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

   (3) The adequacy of procedures for ensuring feedback and continuous improvement in the operation of the proposed project.

Strengths:

1.The applicant has stated that the project goals is to: produce a cadre of qualified STEM teachers; develop accessible field tested STEM materials; increase student readiness for pursing STEM education; and establish evidence to support ARCS program expansions and sustainability. Summative outcomes (intended changes) and activities correlate with the goal of their program and address project implementation. Measurable objectives, population, timeline; and qualitative, and quantitative levels of success such as surveys and performance assessments are provided as well.) Quantifiable levels of success and activities that are aligned with the project proposal could result in the accomplishment of the stated objective and provide fundamental data regarding the effectiveness of the proposed project.
e47,e44 ,e91

2.The applicant has presented a conceptual framework that identifies key components of the project and addresses quality activities for that framework. They have detailed a plan that demonstrates evidence-based activities (outputs) and provided an appropriate rationale regarding of services that will be offered within their program. For example, in order to demonstrate how research supports the design of their project and how it will be incorporated into their program, they have noted the effectiveness of their guided strategy; and have cited studies such as (Bazeley, P. (2013). Qualitative Data Analysis: Practical Strategies. Thousand Oaks, CA: Sage Publications) to illustrate the likelihood that there will be an increased number of elementary teachers actively and effectively integrating CS into instruction. If effective program services and logical relationships are constructed on evidence, they could show success in evaluating the program and assessing the outputs, outcomes, and impact of the project.
e91,e99

3.The applicant has provided a depiction of how continuous feedback and improvement methods are integral to the design of the proposed project. For example, their continuous improvement methods include documentations of interval performance measures that could serve as assessment milestones. Intervals such as, Year 1, Oct.19-Sept20 have been discussed and include plans to modify the program as needed. Effective feedback and continuous improvement techniques could assess the impact of the proposed program, plan and implement new programs, make future project decisions, and demonstrate accountability to the community trust. Project personnel (teachers and team) will: collaborate with external evaluator to discuss frequent formative feedback for project continuous improvement throughout the project period (across all time points); will provide feedback; and review data findings and program improvements throughout the proposed project period. e33, e37

Weaknesses:

1.None Noted

2.None Noted

3.None Noted

Reader's Score: 35

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. **The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:**

   (1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

   (2) The qualifications, including relevant training and experience, of key project personnel.

   (3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

Strengths:

1.The applicant has provided information needed in order to effectively assess the efficiency of their management plan. Techniques regarding how milestone activities will be accomplished and supported in order to achieve outputs; and project timelines, milestones, and cohort responsibilities are defined. For example, External Team Leader: (Project Evaluator); Project Director: (Team Leader and Executive Director of The Center for Educational Partnerships at Old Dominion University); Research Associate Professor: (Director for Research Analytics and Research Associate Professor in The Center for Educational Partnerships at Old Dominion University) are identified for proper oversight of key programmatic operations during project implementation stages. The applicant proposes administrative skills to provide information to key administrators in order to fulfill proposed objectives and effectively implement the proposed project. The implementation, evaluation plan, and strategies to achieve the objectives on time and within budget are documented. If responsibilities, timelines, milestones for accomplishing project tasks
,and qualified personnel with experience and expertise in leadership, administration, evaluation, curriculum development, implementation, and management skills are adequately justified, the management plan could have the capacity to achieve the objectives of the proposed project on time within budget and clearly meet program expectations.
e87,e38, e39

2.Qualifications of the key personnel are appropriate to the respective positions and are addressed to ensure that proper oversight of programmatic operations is maintained. Detailed professional qualifications, experience, and administrative skills to effectively fulfill the objectives of the project are explained. For example, Research Assistant Professor: (Ph.D.) previously served as the project director for several federally funded research and evaluation projects; Research Associate Professor: (Ph.D.) serves as Director for Research Analytics and as Research Associate Professor in The Center for Educational Partnerships at Old Dominion University; and Project Director (Ph.D.) External Team Leader and

previously served on 3 federal-level and 6 state-level STEM education-related grants have sufficient experience, and background, qualifications, to support project activities and outcomes. Qualified personnel with experience and expertise in leadership, administration, research, STEM education, implementation, and management skills could provide assurances that the project has the capacity to effectively carry out the proposed program.
e38

3.To promote sustainability and project expansion, the applicant proposes to: effectively collaborate with state and local agencies while addressing Mathematics and Science Partnership awards; enhance current research around effective professional learning; accelerate statewide effort in licensure support; cooperate with currently endorsed Virginia school districts; and develop an online repository of proposed lessons to be viewed and downloaded. If committed partners and effective sustainability strategies are appropriately identified, there could be fiscal and administrative controls for managing federal fund contributions to support the proposed project beyond the length of the grant.
Appendix, e80, e30

Weaknesses:

1.None Noted

2.None Noted

3.None Noted

Reader's Score: 20

Priority Questions

Competitive Preference Priority - Competitive Preference Priority

1. **Within Absolute Priority 3, we give competitive preference to applications that address the following priority:**

Projects designed to improve student achievement or other educational outcomes in computer science (as defined in the notice). These projects must address the following priority area:

Expanding access to and participation in rigorous computer science (as defined in the notice) coursework for traditionally underrepresented students such as racial or ethnic minorities, women, students in communities served by rural local educational agencies (as defined in the notice), children or students with disabilities (as defined in the notice), or low-income individuals (as defined under section 312(g) of the Higher Education Act of 1965, as amended).

Note: Projects addressing this priority must be administered in a manner consistent with nondiscrimination requirements contained in the U.S. Constitution and Federal civil rights laws.

Strengths:

The applicant addresses STEM innovations with a focus on Computer Science for 18,000 K-5 students and 440 K-5 teachers over 5 years. The project is designed to serve high-need students (members of

subgroups who are traditionally underrepresented in STEM and computer science education), (non-white minorities, students from economically disadvantaged families, and/or students in rural communities). Programs and methods are fashioned to improve the low-performing schools with a concentration of high need students by implementing differentiated instruction, assessments, technology, and curriculum adjustment to increase student readiness for pursuing rigorous STEM and computer science coursework. e20

Weaknesses:

None Noted

Reader's Score: **5**

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Technical Review Coversheet

Applicant: Old Dominion University Research Foundation (U411C190032)
Reader #3: **********

		Points Possible	Points Scored
Questions			
Selection Criteria			
Significance			
1. Significance		25	25
Quality of Project Design			
1. Project Design		35	34
Adequacy of Resources/Quality of Management Plan			
1. Resources/Management Plan		20	19
	Sub Total	80	78
Priority Questions			
Competitive Preference Priority			
Competitive Preference Priority			
1. Absolute Priority 3		5	5
	Sub Total	5	5
	Total	85	83

Technical Review Form

Panel #11 - EIR Early Phase Tier 1 - 11: 84.411C

Reader #3: **********

Applicant: Old Dominion University Research Foundation (U411C190032)

Questions

Selection Criteria - Significance

1. **The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:**

   (1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

   (2) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

Strengths:

The applicant identifies three broad educational problems (e23)
(1) shortage of elementary educators equipped to integrate CS/CT
(2) need for students prepared for a workforce requiring STEM & CS knowledge & skills
(3) educational innovation challenges in rural communities
A project that combines culturally responsive pedagogies with an integrated approach to teaching CS within existing subject areas does have the potential to increase understanding of how elementary teachers develop the capacity to implement instructional change (e26).
The strategy of integrating computer science and/or computational thinking into other content areas is critical to successful implementation of computer science in K-5 classrooms. Addressing CS/CT at the elementary level through equity strategies are more likely to have the desired long-term impact of encouraging and preparing students for STEM and CS related careers.
A project that combines culturally responsive pedagogies with an integrated approach to teaching CS within existing subject areas does have the is a promising new strategy that builds on existing strategies (culturally responsible pedagogy and integrated curricula) (e26).

Weaknesses:

none noted

Reader's Score: **25**

Selection Criteria - Quality of Project Design

1. **The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:**

   (1) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

   (2) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

(3) The adequacy of procedures for ensuring feedback and continuous improvement in the operation of the proposed project.

Strengths:

Goals - (1) develop integrated CS curriculum for K-2, (2) 'achieve high-fidelity implementation' that improves student outcomes and teacher knowledge and (3) build capacity of leaders to replicate and sustain work - are clearly specified (e29, e30). This combination of goals represents a comprehensive approach to improving student outcomes. Developing an integrated curriculum addresses the knowledge that students are to acquire. Ensuring implementation with fidelity addresses the pedagogical and content knowledge of educators delivering instruction. And building the capacity of building/district leaders to sustain the work beyond initial implementation ensures a support structure to facilitate ongoing improvement.
A substantive conceptual basis for mentoring to improve STEM identity and feelings of self-efficacy is provided. (e36). Also,
the What Works Clearinghouse report on dual enrollment research provides a solid conceptual basis for this aspect of the project

Both the coaching cycle and the instructional rounds (teachers visit other teacher's classrooms) provide opportunities for teachers to receive feedback on curriculum implementation from coaches/administrators and from other teachers (e39) Learning from peers in combination with coaching and accountability from administrators

Weaknesses:

The measure of goal 1, produce a cadre of micro-credentialed educators, should be the number or percentage of teachers receiving microcredentials. It should not include the number of teachers completing PD because that is not an assessment of learning.

Reader's Score: 34

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

(1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

(2) The qualifications, including relevant training and experience, of key project personnel.

(3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

Strengths:

The applicant provides a comprehensive list of milestones and timelines (e97) that includes one milestone per year for each of the four goals.

The key personnel have substantial training/experience grant management, STEM, Computer Science and professional development. This is an important indicator of the capacity of the key personnel to execute the project. (e39) Experience in these specific content areas indicate key knowledge necessary for successful implementation and monitoring of the project. that suggest capacity to execute the project. (e39)

The potential for continued support is evidenced by CodeVA's commitment to continue to provide no-cost PD to teachers across the state

Weaknesses:

The applicant does not clearly define responsibilities. Instead, milestones are indicated with the responsible organization identified. The applicant identifies the responsible organization, but does not identify a specific person or position.

Reader's Score: 19

Priority Questions

Competitive Preference Priority - Competitive Preference Priority

1. **Within Absolute Priority 3, we give competitive preference to applications that address the following priority:**

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   Expanding access to and participation in rigorous computer science (as defined in the notice) coursework for traditionally underrepresented students such as racial or ethnic minorities, women, students in communities served by rural local educational agencies (as defined in the notice), children or students with disabilities (as defined in the notice), or low-income individuals (as defined under section 312(g) of the Higher Education Act of 1965, as amended).

   Note: Projects addressing this priority must be administered in a manner consistent with nondiscrimination requirements contained in the U.S. Constitution and Federal civil rights laws.

Strengths:

Proposed study will both expanding access to and expanding participation in computer science education by improving students' exposure in elementary classrooms by increasing teacher content and pedagogical knowledge, and self-efficacy

Weaknesses:

none noted

Reader's Score: 5

Status: Submitted
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